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GROUP 12

ENGINE LUBRICATION

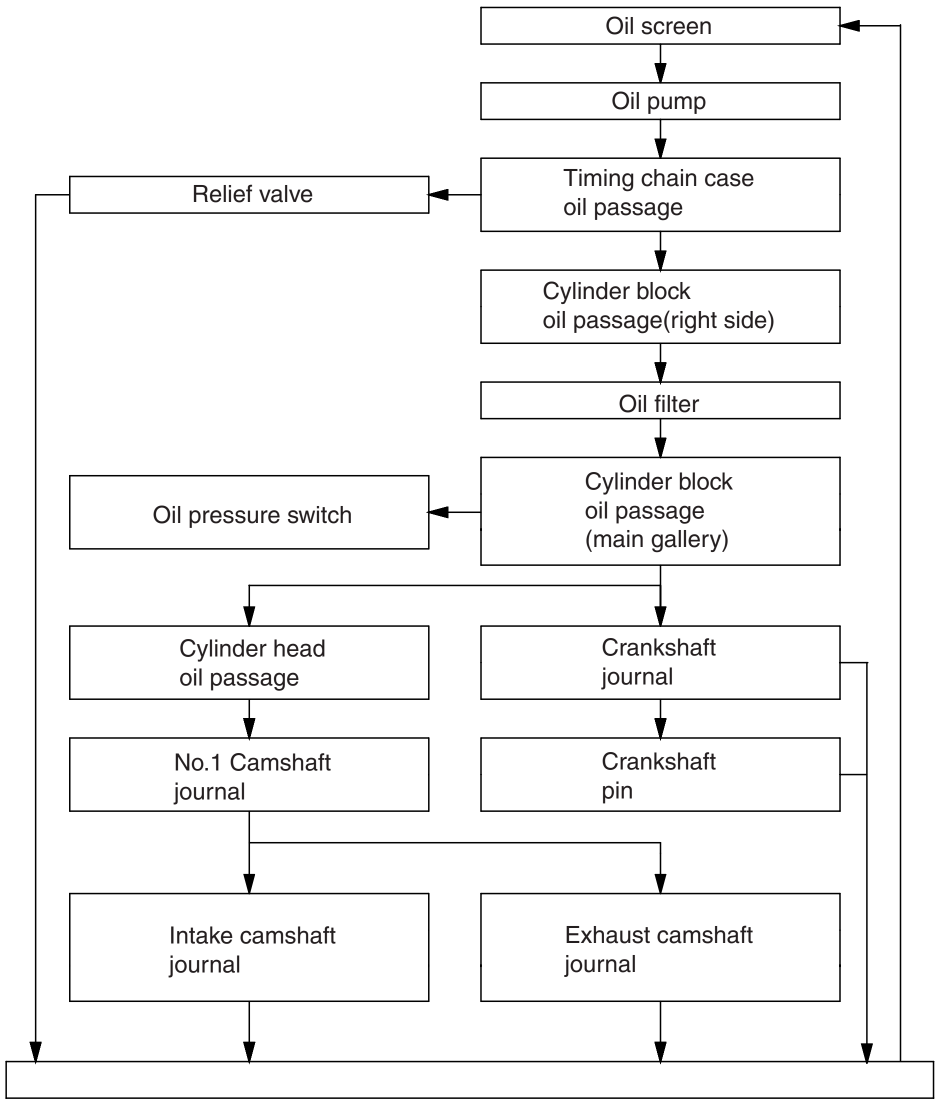
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GENERAL INFORMATION

M2120000100175

LUBRICATION SYSTEM SCHEMATIC<4A9>



AK402024 AC

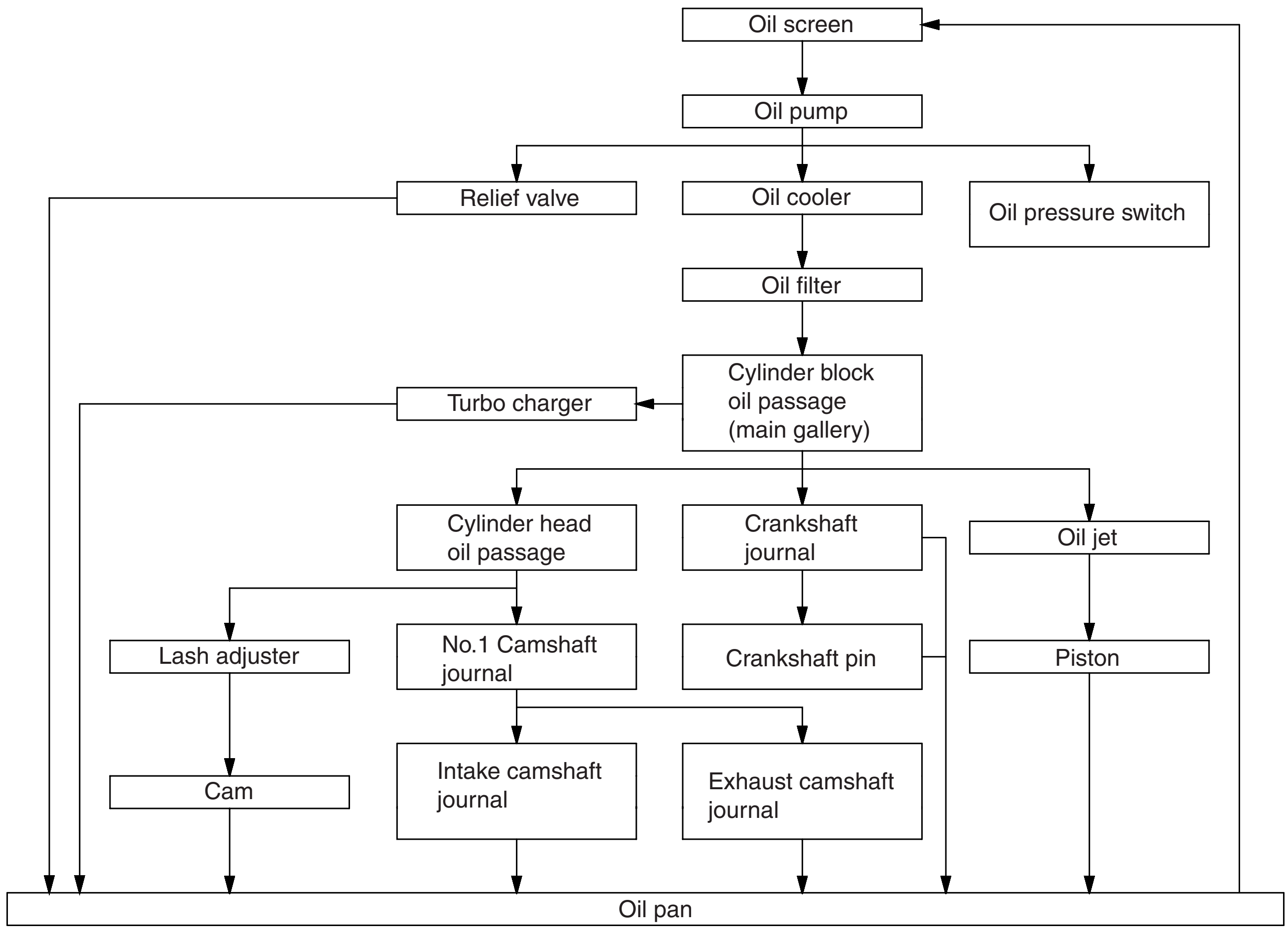
The lubrication system of the 4A9 engine has a full pressure delivery system and a full flow oil filtering system. The oil stored in the oil pan is pumped up/out by the oil pump. After the relief valve regulates the oil pressure, the oil is delivered to the cylinder block through the oil filter, the oil passage of the cylinder block and the each journal of the crankshaft.

The oil delivered to the each journal of the crankshaft is supplied to the pin through the inner passage of the crankshaft.

The oil delivered to the cylinder head is supplied to the each journal of the camshaft through the cylinder head.

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LUBRICATION SYSTEM SCHEMATIC<4G1>



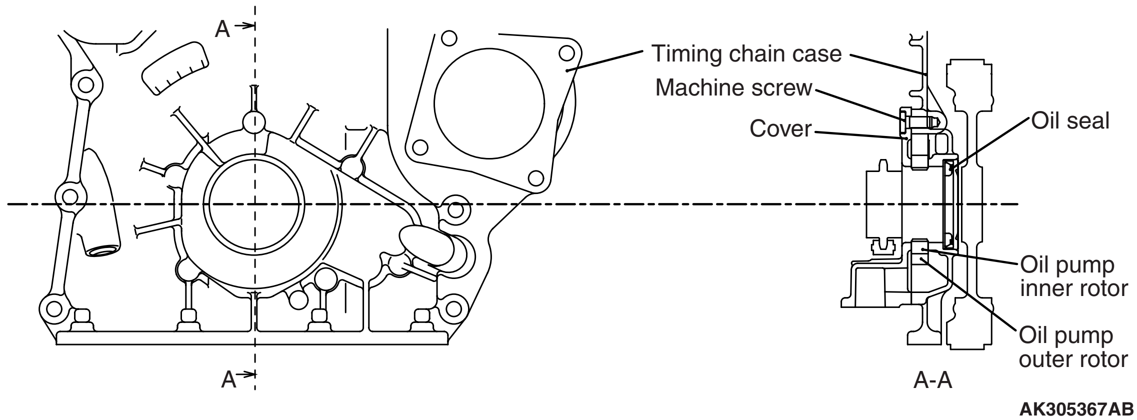
AK402151AC

To correspond with the improved engine output performance by employing the turbocharger, the oil cooler and the oil jet are used for 4GI engine.

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OIL PUMP<4A9>

M2120002000044

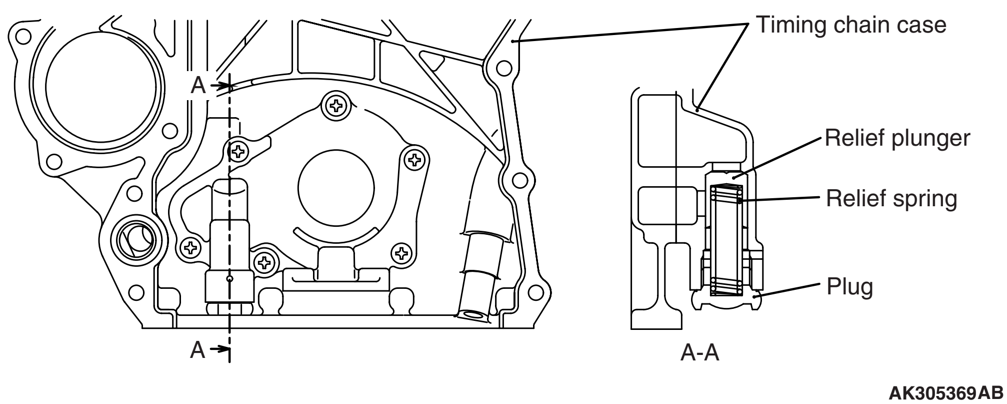


The oil pump is of a cycloid type, directly driven by the crankshaft.
On the cycloid oil pump, as the inner rotor is rotated by the crankshaft, the outer rotor also rotates. The resultant change in spatial volumes between the rotors generates pumping action.
Specifically, oil is sucked into the expanding space and is pushed out from the shrinking space.

Item		Specification
Type		Cycloid pump
No. of lobes	Inner rotor	10
	Outer rotor	11
Displacement L/min(6,000 r/min.)		35

RELIEF VALVE<4A9>

M2120003000047

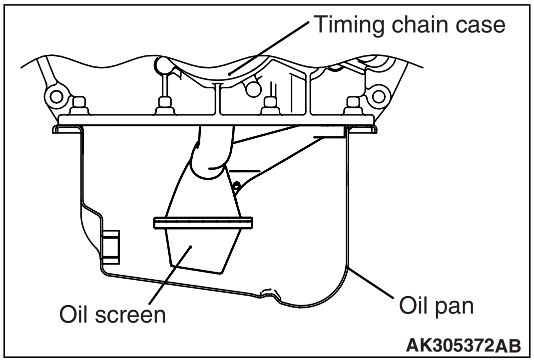


The relief valve is of a plunger type. The valve regulates the maximum pressure of lubrication oil being sent to the engine.
When the pressure of oil from the oil pump exceeds the specified value, the valve opens to relieve the excess flow.
The excess oil is returned to the suction side of the oil pump.

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OIL SCREEN<4A9>

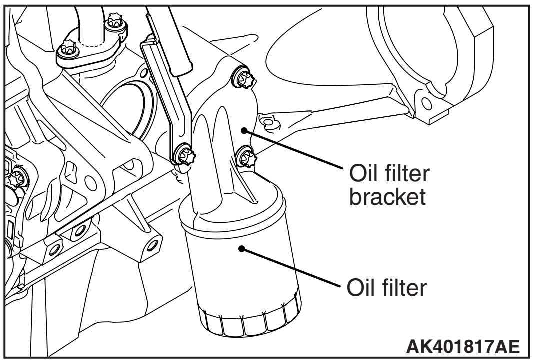
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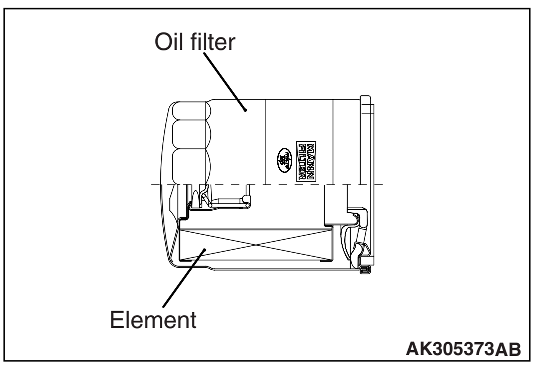


The oil screen is located in the position with the least disturbance to the oil suction volume that results from oil level variation in the oil pan while the vehicle is driven.

OIL FILTER<4A9>

M2120005000032





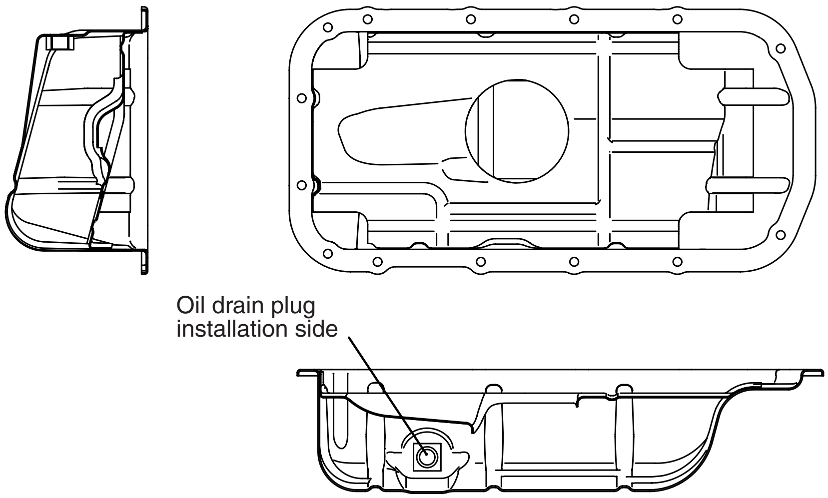
The oil filter is installed to the oil filter bracket attached to the cylinder block.

Item	Specification
Filtering method	Full-flow filtering, Paper element
Filtration area cm^2	750
Rated flow L/min.	25

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OIL PAN<4A9>

M2120006000035

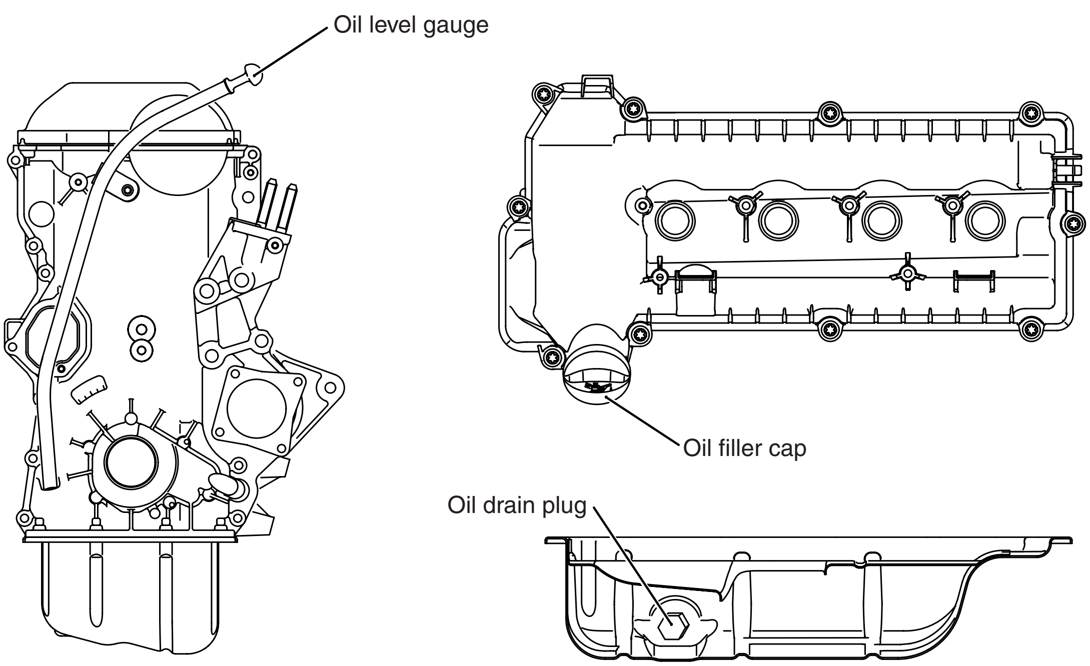


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The oil pan, located below the engine, is made of sheet metal.

OIL LEVEL GAUGE, OIL FILLER CAP, OIL DRAIN PLUG<4A9>

M2120007000038

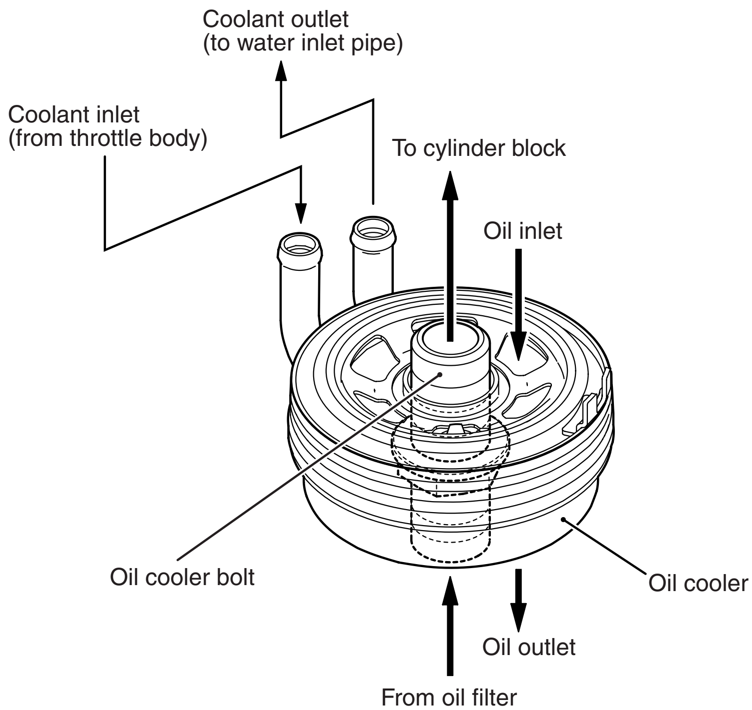


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The oil level gauge, oil filler cap, and oil drain plug are all located in the front of the engine for excellent serviceability.

OIL COOLER<4G1>

M2120008000020



An oil cooler is used for the vehicle with a turbocharger to improve the performance of cooling lubricant.

By circulating the coolant and the oil within the oil cooler, heat is exchanged and the oil is cooled.